

## MINE COUNTERMEASURES

A family of Navy and Marine Corps Mine Countermeasures (MCM) systems is being developed and fielded to allow joint sea-based forces to conduct expeditionary operations at a time and place of our choosing, to include terrain defended by anti-access systems such as mines and obstacles. Tactics, techniques, procedures, and material solutions are being developed to support seamless naval expeditionary operations throughout the littoral and beyond.

### MINE COUNTERMEASURES: FROM THE STERN GATE THROUGH THE BEACH . . .

Sea-based forces first require an effective mine warfare capability to open and maintain sea lines of communication and to operate within the littoral battle space. The ability to operate in areas defended by enemy mines and obstacles requires a family of capabilities, which includes detection, location, neutralization, marking, and data dissemination. This family of capabilities will allow commanders to detect and avoid mines and obstacles when possible, and breach when necessary.

In conducting *Operational Maneuver from the Sea* the Marine Corps relies upon the Navy to maneuver Expeditionary Forces to the beach in such a manner as to allow deployment and prosecution of operations ashore. Some forces, equipment and supplies will have to cross the beach regardless of our future vertical lift capabilities. In specific areas of national strategic interest, the assault force faces challenges in detection and avoidance of littoral waters and landing beaches fouled by mines and obstacles. In these areas of present and future interest, suitable landing beaches are limited – and our potential adversaries know precisely where they are.

Navy deep-water MCM capabilities reside primarily in a triad of surface mine countermeasure (SMCM) ships, airborne mine countermeasure (AMCM) helicopter squadrons, and underwater mine countermeasure (UMCM) teams consisting of Explosive Ordnance Disposal (EOD) detachments and Marine Mammal Systems (MMS). The MCM triad stands ready to conduct large-area or long-endurance MCM operations from deep water to the vicinity of the 40-foot depth contour.

The Navy is engaged in an effort to augment the triad with MCM systems placed onboard the ships of Carrier and Expeditionary Strike Groups as well as supplementing with MCM modules in Littoral Combat Ships. These are designed to provide a self-contained, “organic” capability to detect, avoid, and/or neutralize mines within an operationally acceptable timeline and with acceptable levels of



operational risk. This next generation of systems includes the Remote Mine hunting System (RMS) and the Long-term Mine Reconnaissance System (LMRS), among others.

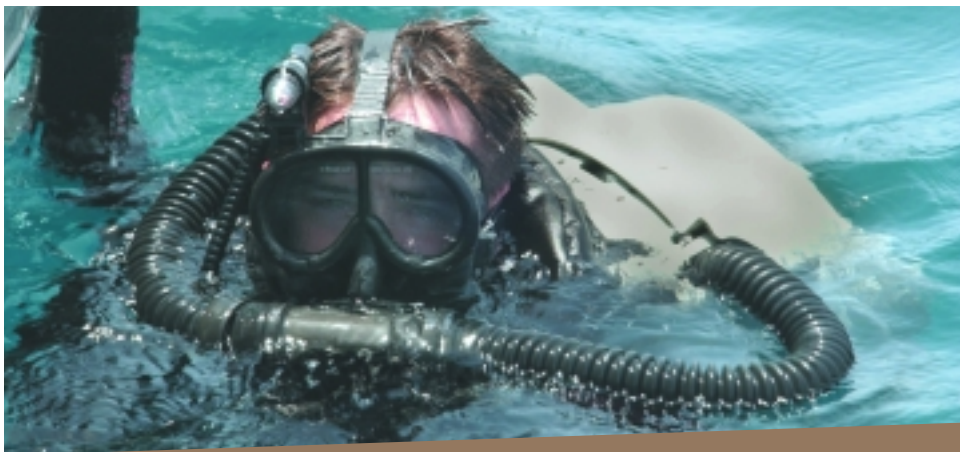
The physics of ship draft requirements, sensor and system operating limits, diver physiology, mine characteristics, an extremely dynamic environment, along with the requirement for covert operations and many other factors limit effectiveness of deep water systems for very shallow water (VSW, 40' to about 10'), surf zone (SZ, about 10' to the beach), and beach zone (BZ) operations. In response, the Navy has fielded a specialized family of capabilities to contend with mines and obstacles in these technologically challenging environments. Navy Special Clearance Team-1 (NSCT-1), a 180-man unit composed of Navy SEALs, Navy EOD, Marine Reconnaissance Divers, and support personnel, fulfills an important part of the requirement. NSCT-1 employs unmanned underwater vehicles, marine mammals, and divers to conduct low-visibility mine exploration, reconnaissance, and clearance operations in waters from 600 feet to 10 feet against opposed beaches.

Navy science and technology efforts are also investigating the effectiveness of precision-delivered Joint Direct Attack Munitions (JDAM) against certain SZ/BZ mines and obstacles. Early indications are that this approach may well provide an interim SZ/BZ MCM assault breaching capability as early as FY 2006-2007.

In the far-term (~FY 2012) the Navy science and technology effort is pursuing "smart" bomb- and gun-delivered darts designed to destroy concentrations of SZ/BZ mines. This promising technological approach offers the potential for standoff operations and the removal of men and mammals from the minefield – two key MCM goals.

### THROUGH THE BEACH AND BEYOND

Once ashore, Naval expeditionary forces must be capable of detecting, breaching, clearing, proofing, and marking mines and obstacles – and of disseminating mine and obstacle data. From the critical Navy-Marine Corps handoff in the vicinity of the beach to the force objectives and beyond, Marine Corps commanders must be able to detect and avoid ground mines and obstacles when possible, and breach them when necessary.



The Marine Corps' current inventory of MCM systems includes the AN/PSS-12 Mine Detector (a metal detector), explosive breaching systems (Assault Amphibian Vehicle with Mk154 Triple-Shot Line Charge, Mk155 Line Charge, Anti-Personnel Obstacle Breaching System (APOBS)), and mechanical breaching/clearing/proofing systems (M1 Tank with Track Width Mine Plow, Armored D-7 Dozer). In aggregate, these systems provide a limited and aging deliberate breaching capability. They do not meet the detection, speed and responsiveness requirements of the modern battlefield.

Three acquisition programs promise to significantly improve Marine Corps MCM capabilities.

- >> ***The Advanced Mine Detector (AMD).*** With an initial operational capability of FY 2008 and full operational capability of FY 2009, AMD will employ ground penetrating radar technology to detect

buried anti-personnel and anti-tank mines. This is a key capability in light of the worldwide proliferation of low- and non-metallic mines

- >> ***The Coastal Battlefield Reconnaissance and Analysis (COBRA) System.*** COBRA is a remote, multi-spectral minefield sensor that may be flown on manned or unmanned aviation platforms. In development Block 1, COBRA will offer standoff detection of surface minefields and obstacles, and provide beach and inland area intelligence data. In subsequent development blocks, COBRA will be enhanced to detect mines and obstacles in the surf zone, and then inland and buried minefields

- >> ***The Assault Breacher Vehicle (ABV).*** With an initial operational capability scheduled for FY 2006 and full operational capability in FY 2007, ABV will be a single-platform minefield breach-



ing/clearing/proofing/marketing system that possesses the speed and mobility of modern mechanized forces.

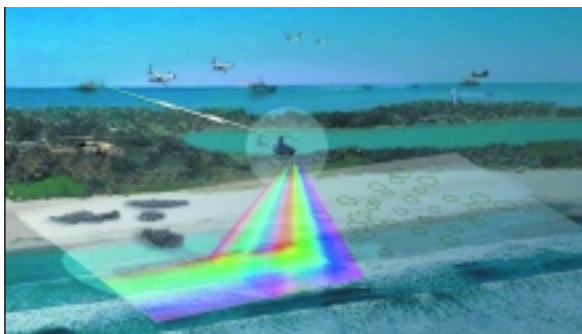
Combining two Mk155 Line Charges, a Full-Width Mine Plow, and a breached lane marking system on an M1 tank chassis, the ABV will offer deliberate and “in-stride” breaching capabilities – allowing commanders to maintain initiative and momentum

Marine Corps MCM doctrine, training and equipment are continuously evolving to cover capability gaps, replace obsolete equipment, and meet the challenges posed by newer threats such as improvised explosive devices, off-route mines, and anti-helicopter mines.

Current Marine Corps MCM systems are challenged in providing Force Commanders with the desired “in stride” capability to achieve and maintain initiative and momentum in a full spectrum anti-access environment. The Marine Corps is developing, and in 2004 will implement, its own MCM master plan designed to fill remaining capability gaps and map out the road ahead.

## **MINE COUNTERMEASURES FOR THE GLOBAL WAR ON TERRORISM**

Operations in the global war on terrorism require the fielding of systems designed to remotely detect Improvised



Explosive Devices (IEDs) and mine-initiated ambushes to ensure the mobility of the MAGTF while ashore. Testing on many technologies to locate off-route, semi-buried mines and IEDs is currently underway, in conjunction with the Joint Area Clearance Advanced Concepts Technology Demonstration (JAC/ACTD) office. One such system that shows promise is the Change Detection Work Station (CDWS), which is being rushed into service with OIF-II deploying forces. The CDWS compares baseline image data with real-time battlespace intelligence to detect abnormalities and identify potential ambush sites, along main supply routes and likely maneuver corridors.

CDWS is a key element in the tactics, techniques, procedures, and material solutions that the Marine Corps is developing to ensure unhindered MAGTF mobility throughout the battle area.